Great Basin Unified
Air Pollution Control District

DRAFT

2011
Ambient Air Monitoring Network Plan

April 20, 2011

Prepared by
Christopher Lanane
Air Monitoring Specialist

Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514
(760) 872-8211
(760) 872-6109 Fax
www.gbuapcd.org

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Tables and Figures

1.0 Introduction

An annual review of all national air quality monitoring networks is required by Federal regulations as a means to identify needs for addition, relocation, or termination of monitoring stations or instrumentation. The annual Air Quality Monitoring Network Plan prepared by the California Air Resources Board (CARB) in the past has included the area within the Great Basin Unified Air Pollution Control District (District). However, over the past year the District has begun the process of becoming a primary quality assurance organization separate from the CARB and is, therefore, required to prepare its own plan and submit it to the U.S. Environmental Protection Agency (EPA). This report describes the network of ambient air quality monitors to be operated by the District during the 2011 calendar year. It includes a review of actions taken in the monitoring network during the 2010-2011 fiscal year and plans for actions in the years ahead. This draft plan addresses the requirements for an annual network plan as listed in the Code of Federal Regulations, Title 40, Part 58, Section 10 (40 CFR 58.10). These regulations require that the report be submitted to the EPA by July 1 of each year after a 30-day public comment period.

The District staff, along with the CARB and EPA Region IX conducted a review of the air monitoring stations throughout the District in 2007. State and Local Air Monitoring Station (SLAMS) designations, monitoring objectives, and spatial scales of representativeness were assigned to the criteria pollutants monitored by site. Each year, District staff conducts an annual review of the air monitoring network to evaluate whether the current monitoring strategies are meeting the needs of the District, to determine compliance with all current Federal and State regulations, and to aid in the development of future monitoring strategies. When monitoring station additions or relocations are warranted, site reports are written and/or updated in the EPA's Air Quality System (AQS) database to document compliance with established monitoring criteria.

2.0 Public Comments

Pursuant to Federal regulations, this draft plan is to be made available for public inspection and comment for at least 30 days prior to submission to the EPA. Notice of availability of the document was published in local newspapers and the document was posted to the District's website (www.gbuapcd.org) on April 23, 2011, under the link, "Current Events." The draft document was also made available to the EPA during the review period. The public review period provides an opportunity for the public, the EPA, and any other interested parties to provide comments on the plan. Comments received will be included in the plan. Following the review period ending May 23, 2011, the plan will be submitted to EPA for approval of any SLAMS network changes.

3.0 Network Design

The District operates eighteen (18) air quality monitoring stations in four planning areas and in the general environs of the District's three counties: Alpine, Inyo, and Mono. The planning areas in the District are: Coso Junction (formerly Searles Valley), Southern Owens Valley, Mono Basin, and Mammoth Lakes. Figures 1 - 3 present maps of the entire District indicating the

planning areas, three of which are PM_{10} nonattainment areas, the monitoring stations currently in operation, and those stations planned for installation this year. Table 1 provides a list of the monitoring stations, the pollutants measured at each station, the EPA Air Quality System (AQS, the EPA's national air quality data base) site codes, and the start date for the station.

Table 2 presents the monitoring objective and spatial scale for each monitor at each site. A list of the monitoring objectives and a description of them is provided in this document. Portions of these monitoring objectives and their descriptions are adapted from the CARB annual network plan for 2010.

After consultation with the District Board and District monitoring specialists, the APCO determines monitoring locations in the District, as delegated by the CARB. Monitoring locations are then added to or removed from the network monitoring plan that is assembled and presented annually to the public for comment. This plan is then submitted to EPA for review. The EPA Region IX administrator has the final authority on the configuration of the monitoring network.

Figure 1. Great Basin Unified Air Pollution Control District Map

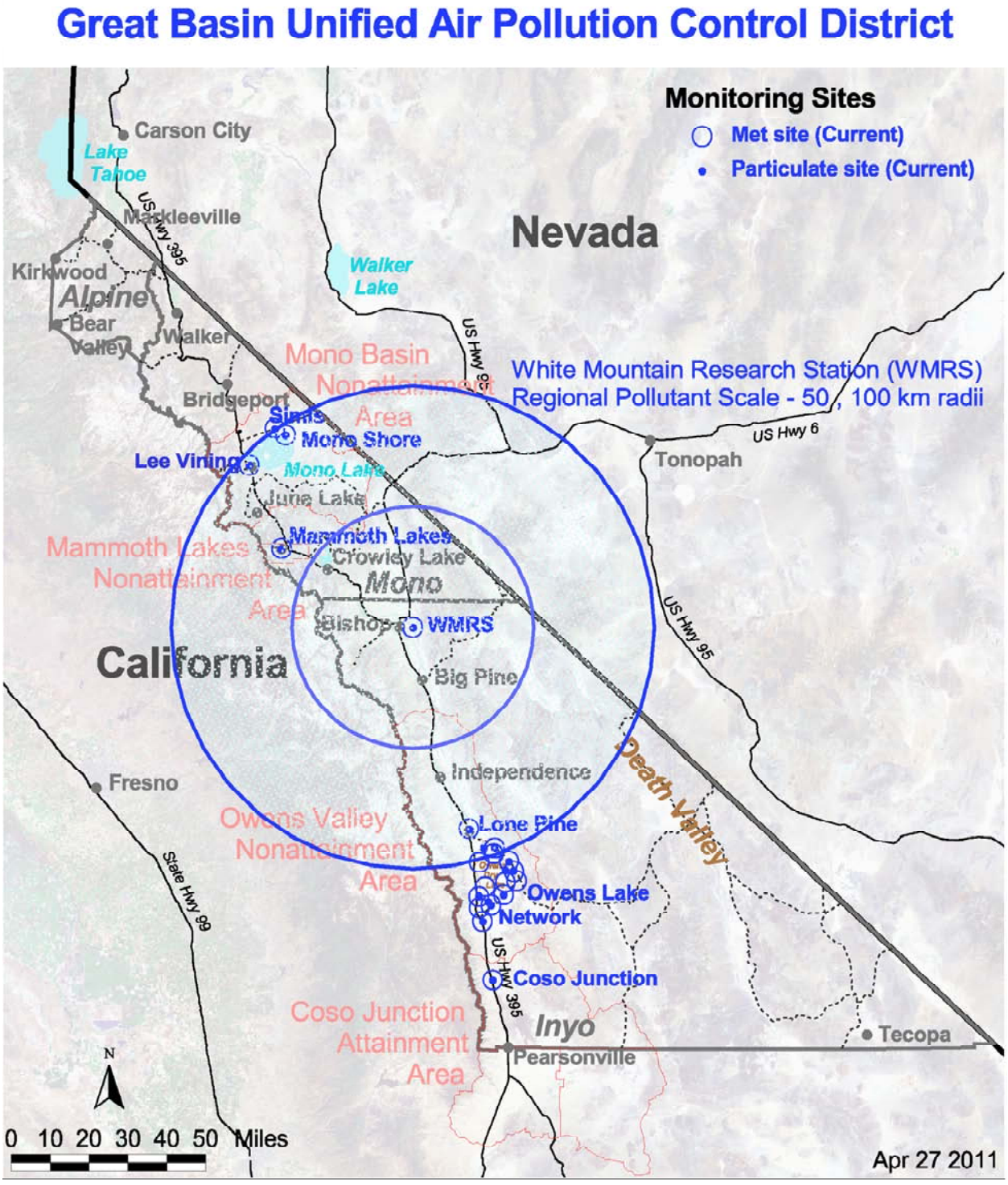


Figure 2. Great Basin Unified Air Pollution Control District Map, Owens Lake detail

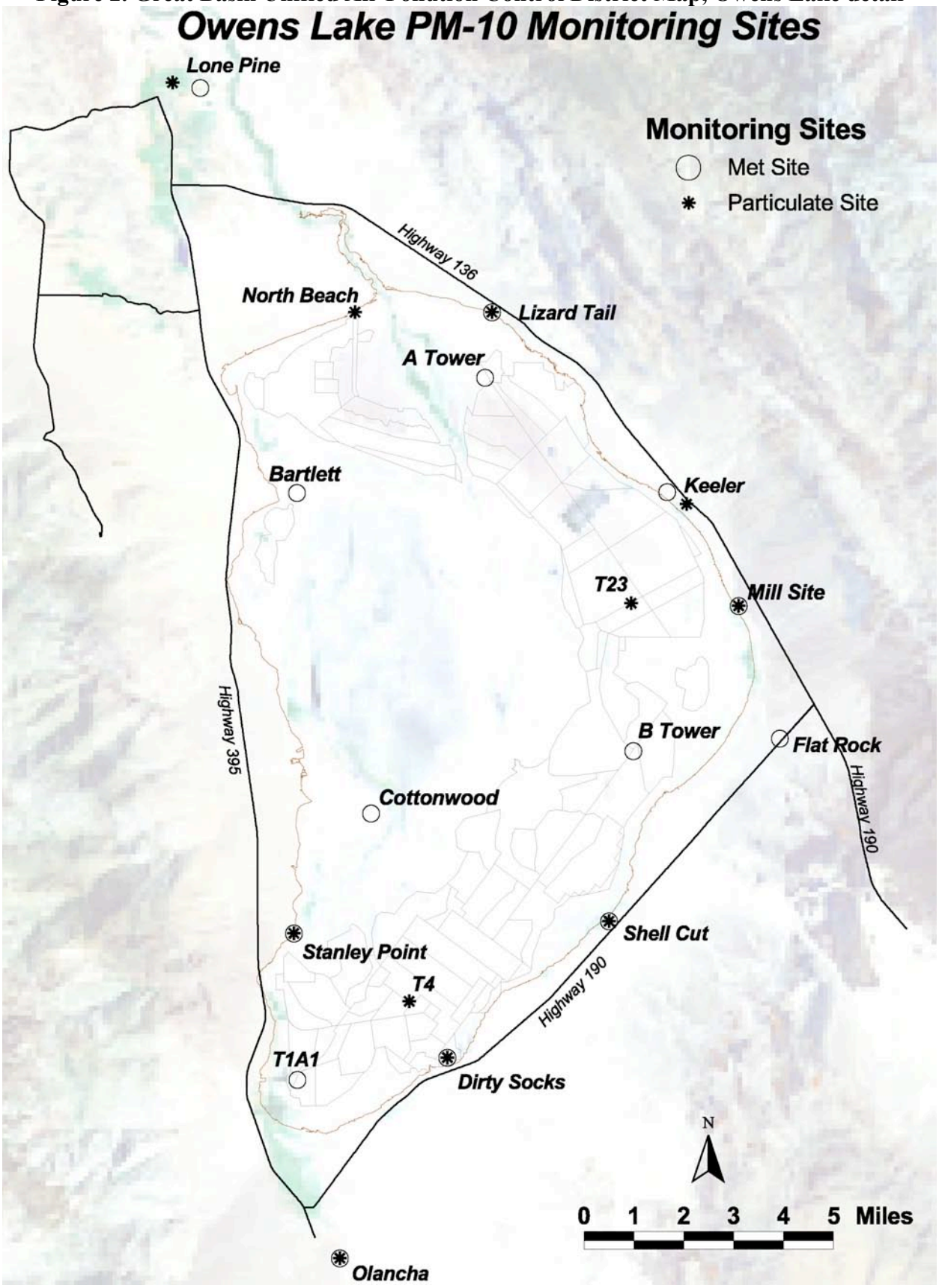


Figure 3. Great Basin Unified Air Pollution Control District Map, Mono Lake detail

Table 1. List of Monitoring Sites and Variables Monitored

Site Name	Network	AQS Number	Pollutants Monitored	Start Date
Dirty Socks	Owens Lake	06-027-0022	PM10	Jun-99
Shell Cut	Owens Lake	06-027-0025	PM10	Jan-01
Flat Rock	Owens Lake	06-027-0024	PM10*	Jan-01
Bill Stanley	Owens Lake	06-027-0026	PM10	Mar-02
Olancha	Owens Lake	06-027-0021	PM10	Aug-95
Lone Pine	Owens Lake	06-027-0004	PM10	Jan-80
North Beach	Owens Lake	06-027-0029	PM10	Nov-08
Lizard Tail	Owens Lake	06-027-0028	PM10	Feb-08
Keeler	Owens Lake	06-027-1003	PM10, PM2.5	Jul-94
Mill Site	Owens Lake	TBD	PM10	Apr-11
T-4	Owens Lake	SPM	PM10	Mar-10
T-8**	Owens Lake	SPM	PM10	Apr-08
T-23	Owens Lake	SPM	PM10	Mar-10
T-25**	Owens Lake	SPM	PM10	Apr-08
Coso Junction	Owens Lake	06-027-1001	PM10	Mar-79
Mammoth Lakes	Mammoth Lakes	06-051-0001	PM10	Apr-84
Lee Vining	Mono Basin	06-051-0005	PM10	Jan-81
Simis Residence	Mono Basin	06-051-0007	***	
Mono Shore	Mono Basin	06-051-0011	PM10	Jan-00
White Mountain†	District	06-027-0002	PM10	Apr-06
NCORE	District	TBD	CO, SO2, NOy	TBD

* PM10 monitoring ended at Flat Rock April 2011. Station now used for meteorological monitoring only.

** Special purpose monitoring stations. PM10 monitoring ended March 2010.

*** PM10 monitoring ended August 2008. Station is currently used for meteorological monitoring only.

† District's Portable Monitoring Station berth.

Table 2. Criteria Pollutant Monitoring Objectives and Spatial Scales

MONITORING OBJECTIVE	SPATIAL SCALE
HC - Highest Concentration	MI - Microscale
PO - Population Oriented	MS - Middle Scale
SI – Source Impact	NS - Neighborhood Scale
BK - Background Level	US - Urban Scale
PT - Pollutant Transport	RS – Regional Scale
VI – Visibility Impacts	NS – National Scale
SPM - Special Purpose Monitor	GS – Global Scale

Site Name	Network	PM10	PM2.5
Dirty Socks	Owens Lake	SI/NS	
Shell Cut	Owens Lake	SI/NS	
Flat Rock	Owens Lake	SI/NS	
Bill Stanley	Owens Lake	SI/NS	
Olancha	Owens Lake	SI/NS	
Lone Pine	Owens Lake	PO/NS	
North Beach	Owens Lake	SI/NS	
Lizard Tail	Owens Lake	SI/NS	
Keeler	Owens Lake	PO/NS	PO/NS
T-4	Owens Lake	SI/NS*	
T-8	Owens Lake	SI/NS**	
T-23	Owens Lake	SI/NS*	
T-25	Owens Lake	SI/NS**	
Coso Junction	Owens Lake	PO-PT/RS	
Mammoth Lakes	Mammoth Lakes	PO/NS	
Lee Vining	Mono Basin	PO/NS	
Simis Residence	Mono Basin	†	
Mono Shore	Mono Basin	HC/NS	
White Mountain	District	BK/RS	
NCORE	District	BK/RS	

* T-8, T-25 were special purpose monitors that were shutdown February 2010.
** T-4, T23 are special purpose monitors that began operation in April 2010.
† PM10 monitoring ended August 2008. Station is currently used for meteorological monitoring only.

Definitions

Background Level monitoring is used to determine general background levels of air pollutants.

Core-based Statistical Area (CBSA) is defined by the U.S. Office of Management and Budget as a statistical geographic entity consisting of the county or counties associated with at least one urbanized area/urban cluster of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration. The two categories of CBSAs are metropolitan statistical areas and micropolitan statistical areas.

High Concentration monitoring is conducted at sites to find the highest concentration of an air pollutant in an area within a given monitoring network. A monitoring network may have multiple high concentration sites as a result of varying meteorology, source area variability, etc.

Metropolitan Statistical Area (MSA) is defined by the EPA and by the U.S. Office of Management and Budget as areas having at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

Micropolitan Statistical Area (MiSA) is defined by the U.S. Census Bureau and the U. S. Office of Management and Budget as an area heaving one urbanized area or urban cluster of between 10,000 and 50,000 population.

Monitoring Objectives are the measures for determining the level of pollutant impacts from particular sources at particular sites, i.e., to determine the highest concentrations (HC) affecting specific places from sources; the impact from a particular source or set of sources (SI) in a given area; the impact caused by concentrations affecting specific populations (PO), communities, etc.; background level (BK) concentrations measured upwind of sources or not impacted by sources; areas impacted by transport of pollution (PT) generated from distant sources; measuring impacts to visibility, plants, or other welfare affects (VI).

Monitoring Planning Area (MPA) is defined by the EPA as a contiguous geographic area with established, well-defined boundaries, such as a metropolitan statistical area, county, or State, having a common area that is used for planning monitoring locations for PM2.5. MPAs may cross political boundaries, e.g., State, County, etc. MPAs are generally oriented toward areas with populations greater than 200,000.

Nonattainment Area is any area that does not attain the standard for at least one of the pollutants for which there are National Ambient Air Quality Standards (NAAQS).

Pollutant Transport is the movement of pollutant(s) between air basins or areas within an air basin. Pollutant transport monitoring is used to assess and address sources from upwind areas when those transported pollutant(s) affect neighboring downwind areas.

Transport monitoring can also be used to determine the extent of regional pollutant transport.

Population Exposure monitoring is conducted to represent the air pollutant concentrations to which a populated area is exposed.

Representative Concentration monitoring is conducted to determine pollutant concentrations over a homogeneous geographical area. These sites do not necessarily indicate the highest concentrations in an area for a particular pollutant.

Source Impact monitoring is used to determine the impact of particular and significant sources of pollutant emissions on the air quality. Air pollutant sources may be stationary or mobile.

Spatial Scales define the concentrations within a given area that has relatively uniform land use and reasonably homogeneous geography. These scales are defined as follows:

> **Microscale** - defines an area with dimensions ranging from several meters up to about 100 meters (several yards up to 100 yards).
> **Middle Scale** - defines an area of up to several city blocks in size, with dimensions ranging from about 100 meters to 0.5 kilometers (100 yards to 1/3 mile)
> **Neighborhood Scale** - defines an area with dimensions in the 0.5 to 4.0 kilometer range (1/3 mile to 2.5 miles). Most of the District's sites have been determined to be neighborhood scale sites.
> **Urban Scale** - defines an area with dimensions on the order of 4 to 50 kilometers (2.5 miles to 30 miles).
> **Regional Scale** - usually defines rural areas and extends from tens to hundreds of kilometers (or miles).
> **National and Global Scale** - these measurement scales represent pollutant concentrations characterizing the nation and the globe as a whole.

Special Purpose Monitors are used for surveys to determine whether a permanent monitor need be installed. They are also used to determine whether an existing monitoring network provides sufficient coverage to an area for determining pollutant impacts to that area.

Trend Analysis monitoring is useful for comparing and analyzing air pollution concentrations over time. Trend analysis can show the progress or lack thereof in improving the air quality for a given area over a period of many years.

Site Comparison monitoring is used to assess the effect of moving a monitoring location a short distance (approximately 2 miles or less) on measured pollutant levels. Some monitoring stations become unusable due to development, change of lease terms, eviction, etc. In these cases, attempts are made to conduct concurrent monitoring at both

the old and new monitoring locations for a period of time in order to compare pollutant concentrations at both.

Multiple purposes for monitoring a pollutant at a particular site are possible. There is some overlap between monitoring objectives as defined by EPA, presented in Table 2, and the monitoring purposes presented in Table 3.

A brief description of the network for each criteria pollutant monitored is provided here. Further site-specific information is presented in Appendix A.

PM_{10}

Medium-volume size selective inlet filter-based PM_{10} monitors (Rupprecht & Patashnick Partisol Plus 2025) are operated at three (3) sites. Monitoring at the sites is conducted on either the Federal one-in-three-day schedule or on a daily schedule. Filter-based monitors typically measure integrated 24-hour-average PM_{10} concentrations.

Continuous PM_{10} monitors (Rupprecht & Patashnick TEOM 1400a AB and/or Thermo TEOM 1405DF monitors) are operated in conjunction with filter-based monitors at two of the three filter-based sites. Continuous PM_{10} monitors alone are operated at an additional 13 sites. The advantage of continuous PM_{10} monitors is that they are capable of measuring hourly pollutant concentrations. These continuous PM10 monitors are concentrated in areas of high PM_{10} impact: e.g. around the shoreline of Owens Lake, in the Town of Mammoth Lakes, at the site of maximum impact on the north shore of Mono Lake. Hourly resolution of PM_{10} concentrations enables the District to more accurately determine the source of the emissions, especially in short-term wind-event driven emissive areas like Owens and Mono Lakes.

$PM_{2.5}$

The District operates one collocated $PM_{2.5}$ monitoring station at the Keeler monitoring site. The monitors are medium volume filter-based Federal Equivalent Method samplers (Rupprecht & Patashnick Partisol Plus 2025 with a very sharp-cut cyclone (VSCC) for $PM_{2.5}$). The primary monitor operates on the Federal 1-in-3-day schedule and the collocated monitor operates on the Federal 1-in-12-day schedule.

Meteorology

The District operates meteorological sensors at nearly all permanent monitoring stations. Meteorological variables measured include wind speed, wind direction and ambient temperature. In addition, at some locations relative humidity, barometric pressure and precipitation are also measured.

Network Description

Owens Lake

The Owens Lake monitoring network consists of a combination of ten (10) ambient air monitoring stations: seven (7) stations ring the lake along the historic shoreline, one of which is a population-based station, located at Keeler; two other population-oriented sites are located in the communities of Lone Pine north of the lake and Olancha, south of the lake. An additional

monitor is located 20 miles south of the lake at Coso Junction. This station is used for modeling of Owens Lake plume trajectories and is used to monitor local source impacts in the Coso Junction Planning Area. Each station utilizes an R&P TEOM monitor for PM10 measurements. All of the ten ambient air monitoring stations are designated as SLAMS sites. During April 2011, the PM10 monitoring system was shut down at the Flat Rock station and moved to the Mill Site.

Dust Identification Program

In addition to the ten SLAMS stations around the Owens Lake, the District operates two air quality stations: one at the locations designated T4 on the south end of the lake, and another, designated T23 toward the east central area of the lake; and four meteorological stations. These are special purpose monitors used to determine dust source areas requiring mitigation and are part of the District's Dust Identification Program. In addition, the program consists of a series of approximately 200 sand motion sensors (Sensits) and accompanying sand collection devices (Cox Sand Catchers (CSCs)). The network also utilizes dust observations made by District personnel during wind events and ten camera stations with a total of 14 cameras collecting images of the lakebed every five minutes during daylight hours. This system coupled with the model and the SLAMS stations described above enables the District to pinpoint emissive areas of the lakebed that cause or contribute to exceedances of the Federal PM10 standard and target those areas for mitigation. A map detailing the locations of the monitoring sites used for the Dust ID program is presented in Figure 4.

Mammoth Lakes

The Mammoth Lakes monitoring network consists of one monitoring station located in the Town of Mammoth Lakes. This station utilizes an R&P TEOM for hourly-resolved PM10 concentrations and an R&P 2025 Partisol Sequential Sampler operating on the one-in-three-day schedule for 24-hour integrated PM10 concentration data. This station is used by the District to determine compliance with the Federal PM10 standard for this previously nonattainment community. The hourly resolved data allows Town personnel to forecast and determine "no-burn" days for wood stove operators in order to maintain compliance with the Federal PM10 standard.

NCORE

The District has also been asked by EPA to install and operate a rural NCORE station. This station will be installed at the District's White Mountain Research Station monitoring site. The station is scheduled to be online by September 1, 2011. Further details on the station are contained in Appendix B, which contains a standalone monitoring plan for the District's NCORE station.

Figure 4. Owens Lake Map: Dust Identification Program Detail

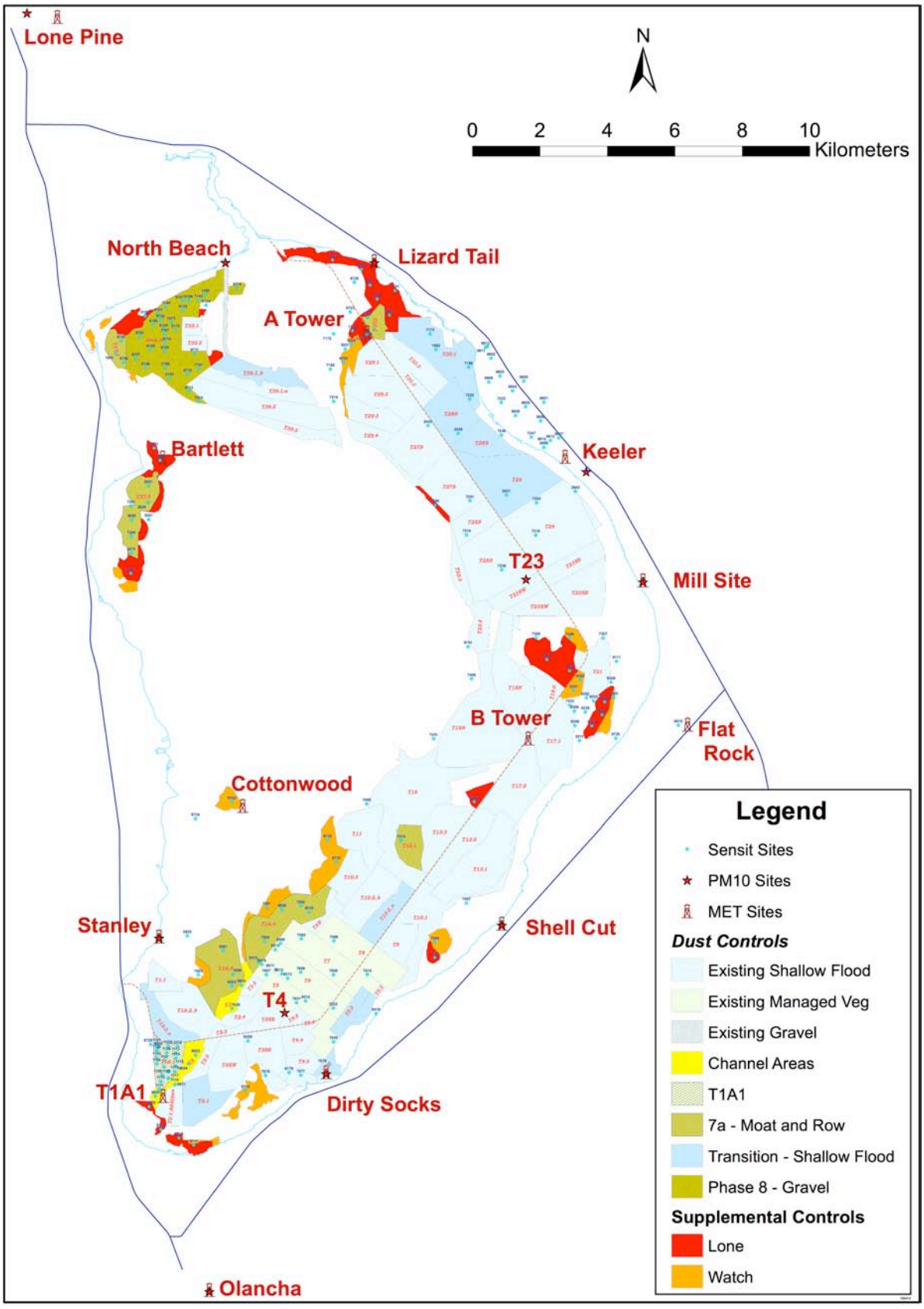
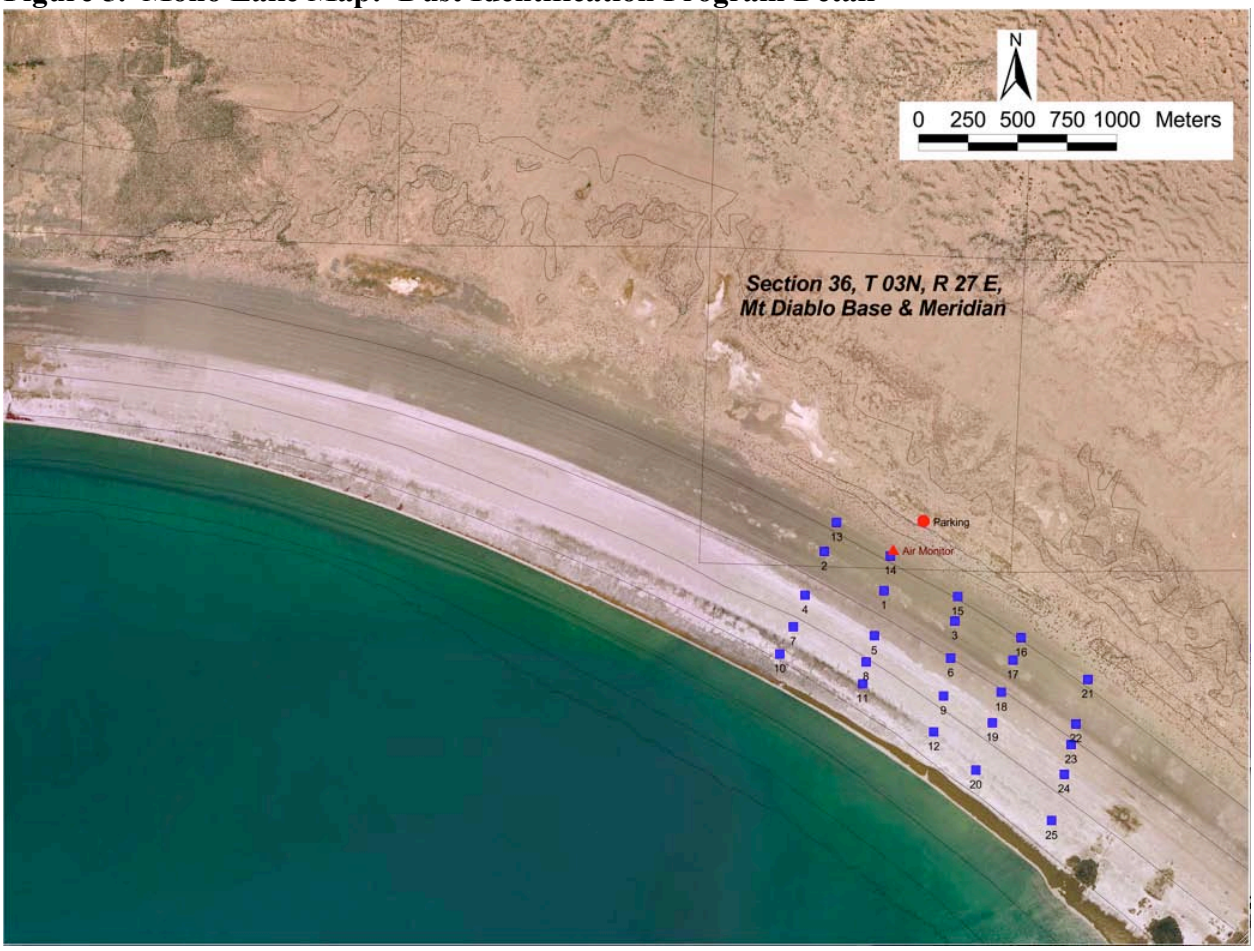


Figure 5. Mono Lake Map: Dust Identification Program Detail



Mono Lake

The Mono Lake monitoring network consists of three monitoring stations: Lee Vining, Simis Ranch, and Mono Shore. Through August of 2008, PM10 concentrations were collected using BGI PQ200 monitors located at Simis Ranch and Mono Shore, two lake shore perimeter sites. PM10 concentrations at Lee Vining, a population-based site, were and are collected using an R&P 2025 Partisol Sequential Sampler. The BGI monitors at Simis Ranch were removed and not replaced due to the fact that no exceedances had been measured there since 1996, and a point-of-maximum-impact site, Mono Shore, being outfitted with a PM10 monitor in 1999. The BGI monitors at Mono Shore were replaced in 2008 with an off-the-grid solar-powered R&P TEOM PM10 monitor. The TEOM provides hourly-resolved PM10 concentrations and has provided the District with the opportunity to develop a Dust ID program at Mono Lake. This Dust ID network consists of two (2) Sensits and 25 CSCs. This network is used to provide information on what portion(s) of the exposed shoreline are emissive and to what extent during a given dust storm. The Mono Lake Dust ID network is presented in Figure 5.

4.0 Special Programs

The District periodically conducts special monitoring programs for rule compliance and pollutant level assessment. The data gathered are for informational purposes initially and may lead to designation of special purpose monitors, as defined under Title 40 CFR 58.20, or to permanent monitoring locations in the District's network, or to nothing beyond the initial purpose of information gathering. During the 2010 monitoring year, the District will be conducting the special programs listed below.

On-Lake PM10 Monitor Intercomparison Study
The District conducted a study from February through June in the southern portion of Owens Lake, at the T-8 station, in order to compare several different types of PM10 monitors. These monitors included: one TEOM 1400ab, one BGI PQ200, three Met One eSamplers, and three TSI DustTraks. The purpose of the study was to determine the viability of utilizing smaller, more portable PM10 monitors for episodic monitoring of PM10 on and around the lakebed in order to more accurately and cost-effectively ascertain emissive area locations and their impacts. Staff determined that the portable monitors were not sufficiently accurate for District PM10 monitoring. A after the data were analyzed, a full report was drafted and the results presented at the AWMA Monitoring Methods Conference in Los Angeles, CA, in November 2010..

Portable PM10 Monitoring
Staff determined there was a need for small portable TEOM monitors that could be transported to monitoring locations and set up for short-term episode PM10 monitoring. Staff has constructed two portable TEOM stations each of which utilizes a propane-fired generator for power. The stations can operate for more than five days on two small tanks of propane. The stations have been successfully operated during several episodes on Owens Lake from February 2010 to date.

5.0 Recent or Proposed Modifications to Network

Owens Lake
The District completed installation of meteorological monitoring towers at the North Beach station, Bartlett Point. Meteorological variables, monitored include wind speed and wind. There are no obstructions between the North Beach station and the Delta meteorological monitoring station. The North Beach station is a permanent addition to the Owens Lake network, as agreed between the District and the City of Los Angeles Department of Water & Power.

Two on-lake PM10 monitoring stations, designated T8 and T25, were removed from the network February/March 2010. Two new on-lake PM10 monitoring stations, designated T4 and T23, were installed in the Owens Lake Network in March 2010. Each of these stations consists of one TEOM 1400ab continuous PM10 monitor in a temperature-controlled shelter. The purpose of these monitors is to measure PM10 emissions near the remaining source areas on the lakebed and

to further refine the Districts Dust Identification Program model. The new special purpose monitors will be operated through February 2012.

Mammoth Lakes
The District has successfully operated a Rupprecht & Patashnick 1400a AB tapered element oscillating microbalance (TEOM) with a filter dynamics measurement system (FDMS model 8500C) in the Town of Mammoth Lakes monitoring station since October 2008. The District also operates a Rupprecht & Patashnick Partisol Plus Model 2025 Federal Reference Method (FRM) medium volume sequential filter PM_{10} monitor operating on the Federal one-in-three-day schedule at the Mammoth site.

Mono Lake
The District has operated monitoring stations in the Mono Basin area for approximately 18 years. Over the last year, District staff assessed the Mono Lake monitoring network and determined that some changes needed to be made. First, staff determined it was necessary to collect hourly-resolved PM_{10} data at the Mono Lake North Shore site, especially during the episodic dust storms at the Lake. Second, it was determined that staff needed to operate the network and utilize resources more efficiently.

In order to address the first determination, a continuous TEOM PM_{10} monitor was installed in May 2008 at the Mono Lake North Shore site to facilitate the collection of hourly-resolved PM10 data. An additional goal was set for the Mono Shore site to operate the continuous PM10 monitor through the entire year, rather than seasonally as had been done with the filter-based monitors.

In addressing the second determination, staff noted that no PM10 violations had been measured at the Simis Ranch site since August 31, 1996. The District had collected 12 years of data subsequent to that measured violation. As a result, the decision was made to cease the collection of PM10 data at the Simis Ranch site as of August 2008.

The North Shore site is off the power grid and consists of a large solar power array and battery system. In order to minimize power consumption, the TEOM is housed in a custom-designed Zomeworks Cool Cell. The Cool Cell regulates the temperature of the Cell housing the TEOM passively using a water radiator and reservoir system to regulate the Cell temperature. The continuous monitor and the seasonally (non-winter) operating filter-based medium volume PM_{10} monitors (BGI PQ200) were operated side-by-side from May through August 2008 in order to provide comparison data between the two different monitoring methods. After that comparison period, the filter-based monitors were shut down and removed from service, leaving the continuous PM_{10} monitor as the primary monitor for that station.

Future changes to the Mono Lake network include the installation of a continuous TEOM PM10 monitor in the community of Lee Vining. The District has operated a filter-based PM_{10} monitor in Lee Vining, located on the southwest side of Mono Lake, for over 15 years. Plans are to install a continuous TEOM PM_{10} monitor at the Lee Vining station in 2011. The District plans to complete the installation of the continuous TEOM PM10 monitor and then remove the filter-based PM_{10} monitor from service in 2012.

National Core Multipollutant Monitoring Station (NCORE)
The District was chosen by EPA Region IX staff to install and operate one of the EPA NCORE monitoring stations. The NCORE network consists of 75 monitoring stations around the nation that will be used by EPA for determining national monitoring and regulatory strategies. Seven monitoring stations are to be placed in California and the District has been chosen to operate one of them: a rural NCORE site. These sites will be funded by EPA for capital equipment and operation and maintenance.

The first phase of funding began with the 2008 calendar year. Funds have been received for the procurement of the prescribed monitoring equipment which includes: a low-level carbon monoxide monitor (CO), a low-level sulfur dioxide monitor (SO2), a low-level oxides of nitrogen monitor (NOy), and a calibration system for the monitors. The EPA Region IX staff has also provided the District with a monitoring station enclosure on long-term loan to the District in which to house the NCORE monitoring equipment. The District has proposed the NCORE site be located at the White Mountain Research Station, east of Bishop, near the current berth of the District's Portable Monitoring Station. Final approval of the site by EPA headquarters will be given by mid-2009. Installation of the station and procurement and installation of the equipment are scheduled for mid-2009.

6.0 Minimum Monitoring Requirements

The District's jurisdictional boundaries encompass no Metropolitan Statistical Areas (MSA) as defined by the U.S. Office of Management and Budget and the U. S. Census Bureau (population greater than 50,000). The District does, however, contain Monitoring Planning Areas defined as "areas determined to be (potentially) in violation of the PM2.5 NAAQS." The District is also required to operate at least one monitor in each of the three (3) PM10 nonattainment areas and in the one (1) attainment area (the Coso Junction Area was designated attainment in October 2010). The District meets or exceeds the minimum monitoring requirements for criteria pollutants as detailed below. Please note that the Coso Junction Attainment Area (formerly the Searles Valley Nonattainment Area) encompasses the northern portion of the Searles Valley, immediately north of Pioneer Point, as well as the Rose Valley in the southwestern portion of Inyo County.

PM_{10}

Nonattainment Area Monitors	Min. No. Monitors Required	No. of Monitors Active
Coso Junction	1	1
Owens Lake	1	12
Mammoth Lakes	1	2
Mono Basin	1	2

PM2.5

MPA	Min. No. Monitors Required	No. of Monitors Active
Keeler	1	2+1 collo.

APPENDIX A

Site Information Summaries
Site Reports

Great Basin Unified Air Pollution Control District
Site Specifie Information

Site Name	Network	AQS Number	Pollutants Monitored	Start Date
Dirty Socks	Owens Lake	06-027-0022	PM10, Met.	Jun-99
Shell Cut	Owens Lake	06-027-0025	PM10, Met.	Jan-01
Flat Rock	Owens Lake	06-027-0024	PM10, Met.	Jan-01
Bill Stanley	Owens Lake	06-027-0026	PM10, Met.	Mar-02
Olancha	Owens Lake	06-027-0021	PM10, Met.	Aug-95
Lone Pine	Owens Lake	06-027-0004	PM10, Met.	Jan-80
North Beach	Owens Lake	06-027-0029	PM10, Met.	Nov-08
Lizard Tail	Owens Lake	06-027-0028	PM10, Met.	Feb-08
Keeler	Owens Lake	06-027-1003	PM10, PM2.5, Met.	Jul-94
T-8*	Owens Lake	SPM	PM10	Apr-08
T-25*	Owens Lake	SPM	PM10	Apr-08
T-4	Owens Lake	SPM	PM10	Mar-10
T-23	Owens Lake	SPM	PM10	Mar-10
Coso Junction	Owens Lake	06-027-1001	PM10, Met.	Mar-79
Mammoth Lakes	Mammoth Lakes	06-051-0001	PM10, Met.	Apr-84
Lee Vining	Mono Basin	06-051-0005	PM10, Met.	Jan-81
Simis Residence**	Mono Basin	06-027-0007	Met.	Nov-81
Mono Shore	Mono Basin	06-027-0011	PM10, Met.	Jan-00
White Mountain***	District	06-027-0002	PM10, Met.	Apr-06
NCORE	District	TBD	CO, SO2, NOy	TBD

* T-8 and T-25 Special Purpose Monitors discontinued February/March 2010
** PM10 monitoring discontinued August 2008.
*** District's Portable Monitoring Station berth.

Great Basin Unified Air Pollution Control District
Site Specifie Information

Site Name	Monitoring	Pollutants Monitored						
	Frequency	R&P Partisol 2025 Sequential PM10/POC	BGI PQ200 Single Fltr PM10/POC	R&P TEOM Continuous PM10/POC	R&P Partisol 2025 Sequential PM2.5/POC	R&P TEOM Continuous PM2.5/POC	North Latitude	West Longitude
Dirty Socks	Daily			1/2			36-19-33	117-57-19
Shell Cut	Daily			1/2			36-21-59	117-53-52
Flat Rock	Daily			1/2			36-25-12	117-50-12
Bill Stanley	Daily			1			36-21-43	118-00-39
Olancha	Daily			1/2			36-16-03	117-59-35
Lone Pine	Daily			1/4			36-36-30	118-03-15
North Beach	Daily			1/1			36-32-34	117-59-28
Lizard Tail	Daily			1/1			36-32-33	117-56-28
Keeler	Daily	1/6		1/4; 2/4,8***	2/1,2	1***	36-29-16	117-52-14
Coso Junction	Daily			1/4			36-02-40	117-56-44
Mammoth Lakes	Daily	1/5		1			37-38-53	118-59-24
Lee Vining	1-in-3	1/3					38-05-29	119-06-52
Simis Residence	1-in-3		4/3**				38-05-29	118-59-52
Mono Shore	Daily		12/2**	1**			38-04-15	118-56-88
White Mountain*	Daily	1		1			37-22-00	118-21-00
NCORE	Daily						37-21-38	118-19-46

* District's Portable Monitoring Station berth.
** Continuous PM10 monitor at Mono Shore started May 2008. Filter-based PM10 monitor discontinued at Mono Shore and Simis Residence August 2008.
*** Installed third quarter 2009.

APPENDIX B

NCORE Station Monitoring Plan

Great Basin Unified
Air Pollution Control District

2011 Ambient Air Monitoring Network Plan For National Core (NCORE) Monitoring Station

located at
White Mountain Research Station
Bishop, California

April 22, 2011

Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

National Core (NCore) Multi-pollutant Monitoring Stations:

In October 2006 the United States Environmental Protection Agency (EPA) issued final amendments to the ambient air monitoring regulations for criteria pollutants. These amendments are codified in 40 CFR parts 53 and 58. The purpose of the amendments was to enhance ambient air quality monitoring to better serve current and future air quality needs. One of the most significant changes in the regulations was the requirement to establish National Core (NCore) multi-pollutant monitoring stations. These stations will provide data on several pollutants at lower detection limits and replace the National Air Monitoring Station (NAMS) networks that have existed for several years. The final network plan must be submitted to EPA by July 1, 2010 and the stations are to be operational by January 1, 2011. Delays in funding have resulted in a delay of the start of monitoring until September 2011.

The NCore Network addresses the following monitoring objectives:

- timely reporting of data to the public through AIRNow, air quality forecasting, and other public reporting mechanisms
- support development of emission strategies through air quality model evaluation and other observational methods
- accountability of emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors
- support long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards (NAAQS)
- compliance through establishing nonattainment/attainment areas by comparison with the NAAQS
- support multiple disciplines of scientific research, including; public health, atmospheric and ecological

In 2007, 2010, and 2011, EPA provided funding to the Great Basin Unified Air Pollution Control District (the District) to establish an NCore station in the Eastern Sierra region of California. After evaluating the existing network, historical data, meteorology, and topography the District recommends the following changes to its air monitoring network to become effective July 1, 2009, and implemented by January 1, 2010:

1) Establish an NCore multi-pollutant monitoring station in the Eastern Sierra region at the White Mountain Research Station (WMRS), 3000 East Line Street, Bishop, California. The location meets the objective for a rural NCore site and meets regional scale criteria for $PM_{2.5}$, PM_{10}, ozone (O_3), total reactive nitrogen (NO_y), and carbon monoxide (CO).

2) For the near-term, collocate the NCore station with the District's existing Portable monitoring station, which collects data for PM10 (continuous), wind speed, wind direction, ambient temperature, and relative humidity.

Monitoring Objective
Determine compliance with NAAQS; observe pollution trends for national data analysis, provide pollution levels for daily index reporting; and provide data for scientific studies.

Table 1 Monitors

Monitor Type	Designation	Analysis Method	Frequency of Sampling
Carbon Monoxide (CO)	NCore	Automated Reference Method utilizing trace level non-dispersive infrared analysis.	Continuously
Sulfur Dioxide (SO_2)	NCore	Automated Equivalent Method utilizing trace level UV fluorescence analysis	Continuously
PM_{10} TEOM	SLAMS	Automated Equivalent Method utilizing Tapered Element Oscillating Microbalance/gravimetric analysis	Continuously
Total Reactive Nitrogen (NO_y)	NCore	Automated trace level chemiluminescence analysis.	Continuously
Meteorological	SLAMS	Air quality measurements approved instrumentation for wind speed, wind direction, humidity, temperature	Continuously

Quality Assurance Status
All Quality Assurance procedures shall be implemented in accordance with 40 CFR 58, Appendix A. The District's current Quality Assurance Project Plan covers PM_{10}, $PM_{2.5}$, and meteorological measurements. For the trace level instruments, a quality assurance project plan will be developed and submitted prior to use of the trace level instruments and standard operating procedures (SOPs) will be developed for each new instrument used in the project.

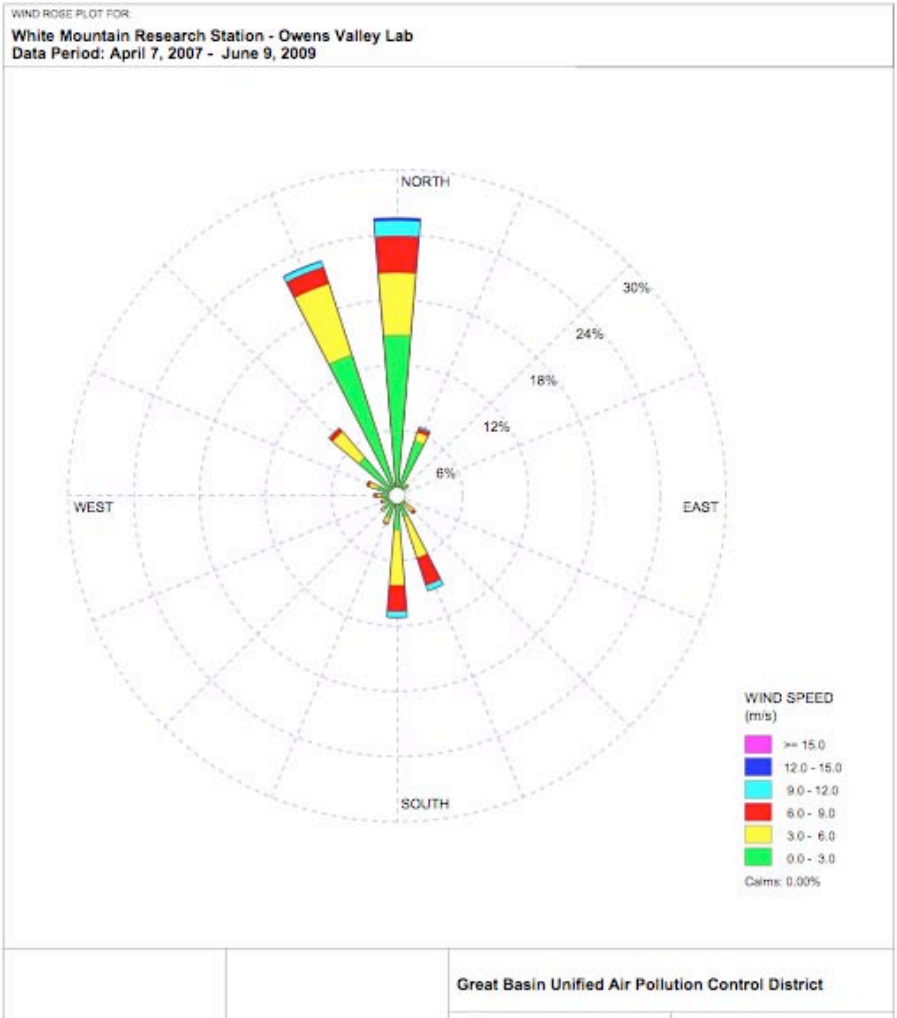
Area of Representativeness
40 CFR Part 58 Appendix D provides design criteria for ambient air monitoring. The monitoring objective for the NCore site is to produce data that represents a large area and therefore the spatial scale of the site is important. The spatial scale defines the physical dimensions of the air parcel nearest to a monitoring site throughout which actual pollutant concentrations are reasonably similar. It is determined by the characteristics of the area surrounding the air monitoring site and the site's distance from nearby air pollution sources such as roadways, factories, etc. In the case of rural NCore stations, which are to be located to determine general background concentrations levels, the spatial scales to be used are regional or larger. Table 2 shows the area of representativeness for each pollutant for the WMRS site.

Table 2: Spatial Scales for Each Pollutant

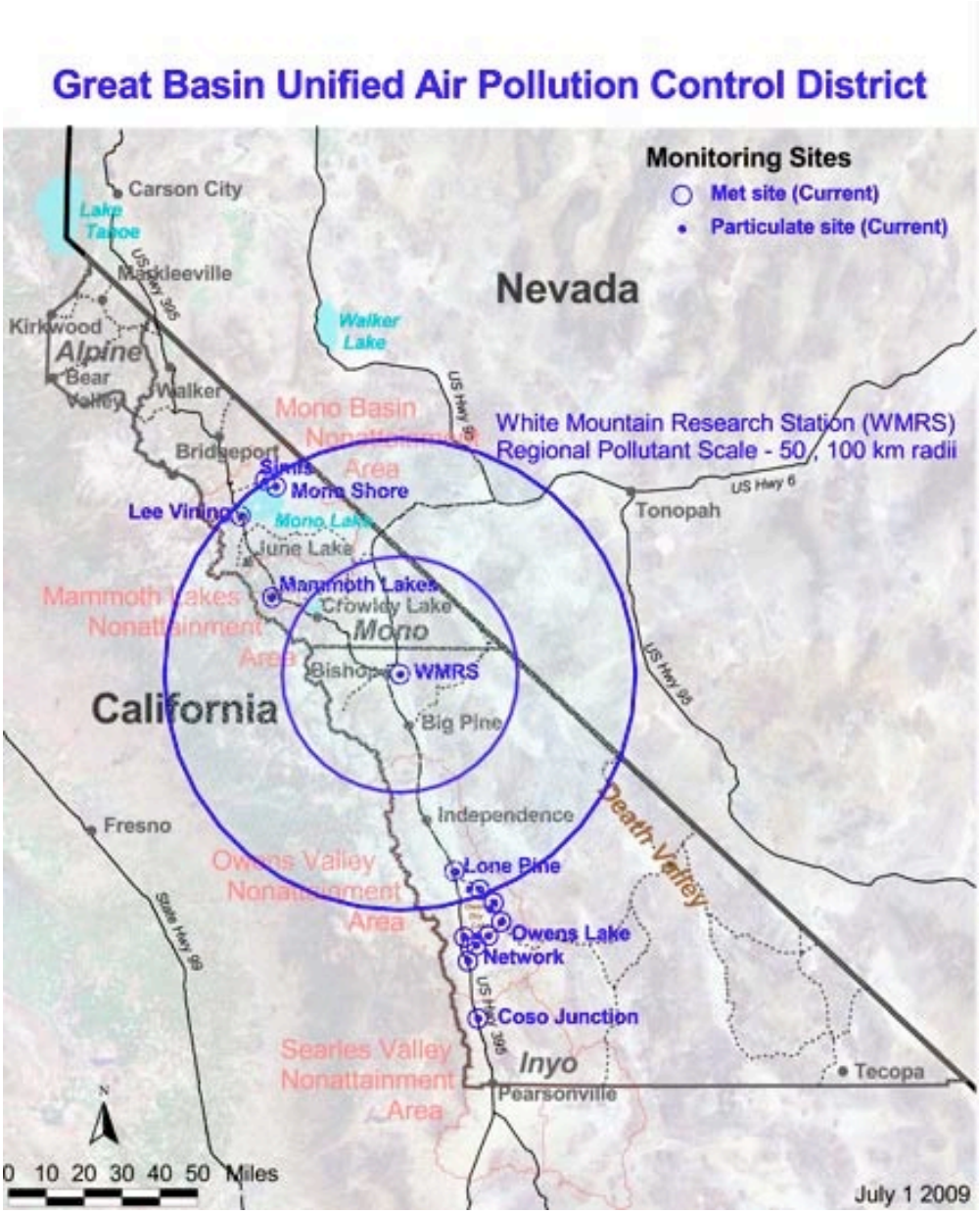
Pollutant	Spatial Scale	Comments
NO_y	Regional Scale	Same scale as used for O_3
CO	> Middle Scale	No Regional scale for CO
SO_2	> Neighborhood Scale	No Regional scale for SO_2
PM_{10}	> Neighborhood Scale	No Regional scale for PM_{10}

For regional scale the area covered is tens of kilometers to hundreds of kilometers.

There are no MSAs within the District's current monitoring network due to the sparse population in this high desert setting, approximately 2 people per square mile. On a 10 km scale the land use varies from riparian areas along the Owens River 1.5 kilometers west of the site to light industry, small commercial, and residential in the City of Bishop (population 4,000) 6 kilometers west of the site. The topography of the area varies from high desert to mountain peaks.



The White Mountain Research Station, where the NCore monitoring station is to be located, is in the Owens Valley, a high-desert valley, the floor of which is at an average elevation of 4,000 feet above mean sea level. The valley is open north to south and is bordered on the east by the White Mountains that rise from the valley floor to an elevation of 10,000 feet, with peaks up to 14,000 feet. The valley is bordered on the west by the Sierra Nevada range, which rises in elevation up to 14,000 feet. As can be seen from the District map and the area-wide view below, the proposed NCore site is located East of the City of Bishop and of the developed area around the City. The wind rose above indicates the prevailing wind directions of north and south, up and down the Owens Valley. The placement of the NCore site east of Bishop provides an excellent location for measuring background pollutant concentrations as there are no major pollution sources, other than particulate matter, for 100km.



White Mountain Research Station
Regional Pollutant Scale 50 and 100 km radii

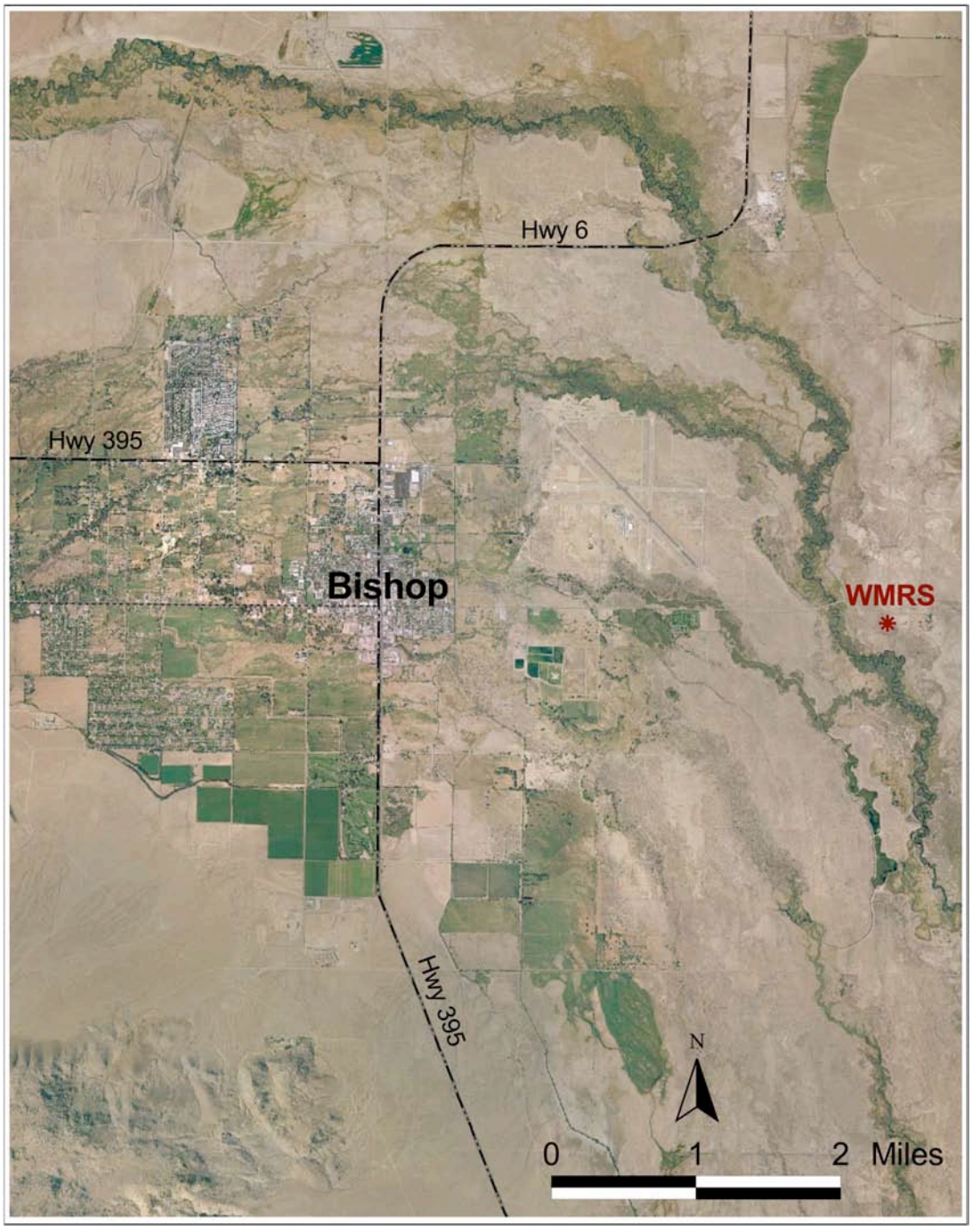
The Owens Valley, Mono Basin, and Mammoth Lakes Nonattainment areas have been designated as such due to PM10 concentrations that exceed the Federal standard of 150µg/m3. The sources of these concentrations are wind-blown dust from the exposed lakebeds of the Owens and Mono lakes and wintertime wood smoke and road cinders, in the case of Mammoth Lakes. The PM10 influence around Mono Lake is largely restricted to the immediate basin by the topography. The influence around Owens Lake is mostly caused by north winds driving the dust south. Occasional south wind storms will drive the dust northward, but the impacts generally reach only to the community of Independence, 20 miles north of Owens Lake and 40 miles south of the station at the White Mountain Research Station.

White Mountain Research Station
Topographic Regional Map (90 km radius shown)

Site Description and Spacing:

Site Name: White Mountain Research Station
AQS ID: 06-027-0002
Location: 3000 East Line Street
County: Inyo
GPS Coordinates: 37°21'38" North Latitude, 118°19'50" West Longitude
Date Established: April 7, 2006
Inspection Date: August 20, 2009
Inspection By: Catherine Brown, EPA IX
Site Approval Status: Approved

White Mountain Research Station Compound



The station is located on the grounds of the University of California White Mountain Research Station. The location is in the northeast portion of Inyo County and is approximately 0.5 km east of the Owens River and 4 km east of Bishop, California.

NCore and $PM_{2.5}$ SLAMS Siting Criteria

Appendix E to 40 CFR Part 58-*Probe and Monitoring Path Siting Criteria for Ambient Air Quality Monitoring* contains specific location criteria applicable to NCore and SLAMS siting. The following measurements and data were obtained for evaluation of compliance with the criteria.

1. Horizontal Placement of Sampling Probes:

The gaseous instruments will be placed in a 10'w x 16' l x 8'h air monitoring shelter to be located in an open area. The nearest building is the WMRS maintenance building approximately 150 meters east of the station. The sample probe inlets will be installed approximately 4 meters above the ground. The Districts Portable monitoring station will be placed next to the air monitoring shelter and will included a 10-meter "nested" meteorological tower.

Any manual particulate samplers to be used for the NCore program will be placed on the roof of the monitoring shelter, on the roof of the District's Portable monitoring station adjacent to the NCore shelter, or on a metal platform behind the NCore shelter. The height of the inlets of the particulate samplers will vary between 3-4 meters. The inlet for the continuous PM10 monitor in the Portable station is approximately 1.5 meters above the roof and approximately 4.25 meters above the ground. Inlets for the continuous particulate samplers in the NCore station will be placed on the roof of the air monitoring shelter with the sample inlets 1.5 to 2 meters above the roof (4 meters above ground). The control units will be located inside the temperature controlled shelter.

2. Spacing from Obstructions:

There are no obstructions to air flow around the site. The WMRS maintenance building is located 150 meters east of the proposed NCore station location and is 4 meters in height. This potential obstruction is 37 times the height of the obstruction away from the station and is not in a quadrant where it would affect the prevailing wind direction.

3. Spacing from Roadways:

Tables E-1, E-2, and Figure E-1 of 40 CFR Part 58 Appendix E list the minimum distances from roadways a monitoring probe needs to be based on the average daily traffic (ADT) counts. Table 3 summarizes the findings and includes the minimum separation distance from roadways for each pollutant. ADT counts were obtained from traffic count data from the California Department of Transportation's (CalTrans) website, at http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2005all

Table 3
Spacing from Roadways Analysis

Roadway	ADT	Distance from site (meters)	Minimum Distance Required (meters)			
			Ozone Table E-1	NO/NO_y Table E-1	CO Table E-2	PM Figure E-1
US Highway 395	14,000 (2005)	4,000	40	30	45	80
East Line Street	<1000 (estimated)	85	40	30	45	80

4. Spacing from Minor Sources:

The closest source to the site is the community of Bishop, California, 4 kilometers east of the site. The greater Bishop area has a population of approximately 6,100. Pollutant sources are limited to small businesses, residential home heating, vehicular traffic (14,000 per day) along US Highway 395. There are three permitted sources approximately 3 kilometers east of the site. These sources are listed below (Table 4) along with their emission rates. The first two are concrete batch plants and the last one is a hot mix asphalt plant. These plants' operating schedules are limited to 5 or 6 days per week and to a certain number of weeks per year, usually in the summer months.

Table 4
Minor Source Emissions

Source	Emissions Type	Hours of Operation Per day	Emissions Rates	
			Pounds Per Hr. For Op	Pounds per hour 24hrs/day
7/11 Materials	particulate	14	5.7	0.26
Hiatt	particulate	12	3	1.13
SNC	Particulate	10	18.2	0.53

N

W E

S

Direction	Description	Distance from Site
North	Power line along Line Street/Laws-Poleta Road	85 meters
North East	White Mountains	10 kilometers
East	WMRS Maintenance Building (maintenance and repair shop)	150 meters
South East	Owens Valley, open land	
South	Owens Valley, open land	
South west	Owens Valley, open land	
West	Bench above Owens River	600 meters
North West	Owens Valley, open land	

Site Details:

This Google Earth[tm] image indicates where the air monitoring shelter will be located on the White Mountain Research Station compound. The shelter will be 10' w x 16'l x 8' h. Half of the roof of the shelter is flat to support the sample inlets for the continuous particulate samplers and has additional room for other samplers if the need arises. The 10 meter meteorological tower and the District's Portable monitoring station will be placed next to the NCore shelter. The meteorological tower is a "nested" type that provides for easy servicing and calibration of the meteorological instruments. The shelter will be wired for 200 amp service and have internet and cellular telephone connections. The shelter will have a heating and air conditioning system that will maintain indoor temperatures between 30-40 º C.